# TOPIC: PORIFERA:CHARACTERISTICS,CANAL SYSTEM

LECTURE NO:07
B.SC PART 1
ZOOLOGY(HONS.)-PAPER I-GROUP A
CHAPTER 4
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## Objectives:-

Understanding the general characters and classification up to order level, *Sycon* structure, reproduction and development, different types of canal system and affinities.

## Introduction:-

Members of phylum Porifera or sponges are most primitive of metazoans or multicellular animals. It includes more than 5,000 species. They appear to be quite life-less and plant like. Porifera are a conspicuous and colorful component of many seascapes.

## General characters and classification up to order level

### General characters:

Porifera is multicellular organisms.

All are marine with few exceptions (A single family of freshwater species. e.g., Spongilla).

Its shape some time cylindrical, branching, globular, brightly or dull in colour, they are orange, red, yellow or green colour.

Solitary or colonial.

The body is perforated by pores and canals but lack other organs (mouth or nervous system).

Body is asymmetrical or radially symmetrical. Body surface has numerous pores, the ostia, serving for inflow of water.

The water current passes through ostia into the chambers and the central cavity and finally comes out of the body through terminal aperture, the osculum.

Body wall has outer pinacoderm (dermal epithelium), inner choanoderm (gastral epithelium) and gelatinous non-cellular mesenchyma in between.

No definite organ for feeding and digestion.

Digestion is intracellular.

The water current serves to bring food organisms and oxygen in the body and carry away the excretory and reproductive products. Cells are loosely arranged and do not form definite layers. Thus are not truly diploblastic.

Choanocytes (flagellated collar cells) usually line special chambers.

Choanocytes are present only in sponges.

Sensory and nerve cells absent.

Each cell is directly stimulated and transmits sensations to other cells also.

Development is indirect through free swimming cilliated larva, the amphiblastula or parenchyma.

All sponges are hermaphrodite.

The sexual reproduction occurs by the sperms and ova but asexual reproduction by buds or gemmules.

Sponges have great power of regeneration.

Sponges are cultivated for commercial purposes.

About 10,000 species of sponges are known in the world.

## Classification up to order level:

The classification of sponge is based chiefly on types of skeleton found in them. This phylum has been classified variously but the classification suggested by Hyman in 1940 and Burton (1967) are of considerable importance. The phylum porifera is divided into three classes:

PHYLUM-PORIFERA

CLASS-1: CALCAREA OR CALCISPONGIAE

ORDER:
- Homocoela (Asconosa)
- Heterocoela (*Sycon*osa)

CLASS-2: HEXACTINELLIDA OR HYALOSPONGIAE

ORDER:
- Hexasterophora
- Amphidiscophora

CLASS-3: DEMOSPONGIAE

SUBCLASS- 1 TETRACTINELLIDA

ORDER:

Myxospongida

arnosa or Microsclerophora

horistidia

SUBCLASS-2 MONAXONIDA

ORDER:

Halichondrina

Poecilosclerina

Haplosclerina

Hadromerina

SUBCLASS-3 KERATOSA

## CLASS 1: CALCAREA OR CALCISPONGIAE

These are small sized calcareous sponges (10cm in height).

Solitary or colonial.

Body cylindrical or vase like in shape.

Skeleton formed of calcareous spicules which may be one, three, or four rayed.

All are marine animals.

Body organisation may be asconoid, Syconoid or lenconoid type.

ORDER-1 HOMOCOELA

Asconoid sponges with radially-symmetrical and cylindrical body.

Body wall thin and unfolded; choanocytes line the spongocoel.

Often colonial.

Example- *Leucosolenia, Clathrina*

ORDER-2 HETEROCOELA

Syconoid and leuconoid sponges with thin walled vase shaped body.

Choanocytes are found in radial canals or inflagellated chambers only. Example-*Schypha* (Fig.1)

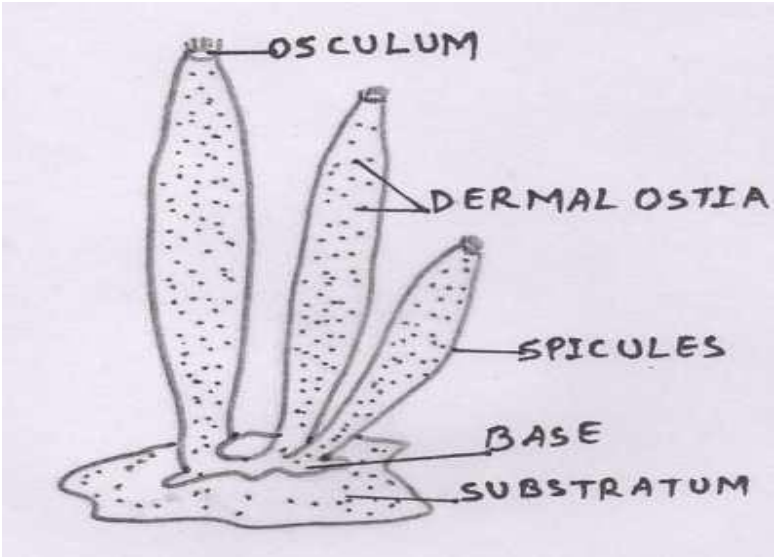


*Fig.1: Colony of Sycon*

## CLASS 2: HEXACTINELLIDA OR HYALOSPONGIAE

Generally hyalospongiae are found in medium sized sponges but some time few sponges reached one meter in length.

It is commonly known as glass sponges.

Its body shape cylindrical, funnel shaped or cup shaped.

The canal system was very typical and body organization Syconoid type.

Hexactinellida class is found in deep marine water.

ORDER-1 HEXASTEROPHORA

Spicules are star shaped (six-shaped) eg., hexasters.

Flagellated chambers regularly and radially arranged.

Usually attached to substratum directly.

Exa

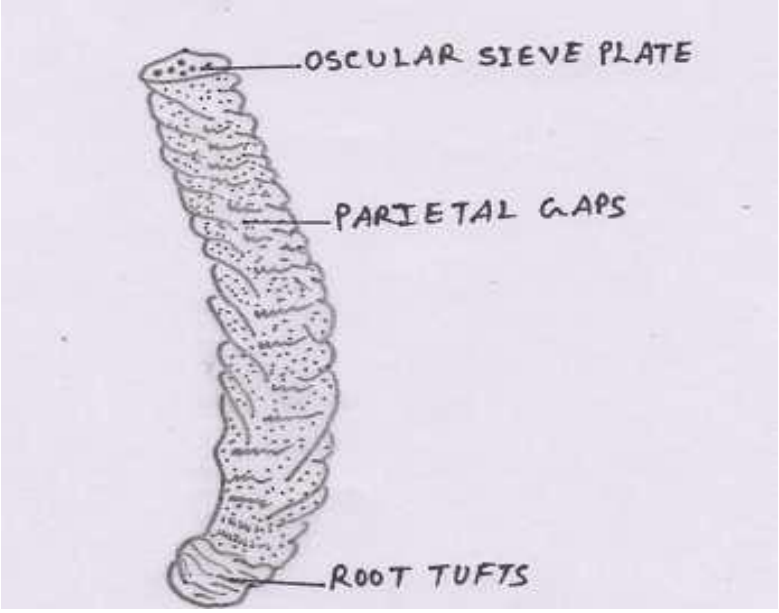


*Fig.2: Euplectella*

ORDER-2 AMPHIDISCOPHORA

Spicules with amphidics, i.e. with a convex disc bearing backwardly directed marginal teeth at both the ends-hexasters absent.

Attached to substratum by root tufts.

Example-(a) *Hyalonema* (Fig.3-Glass-rope sponge),

(b) *Pheronema* (Fig.4-Bowl sponge).

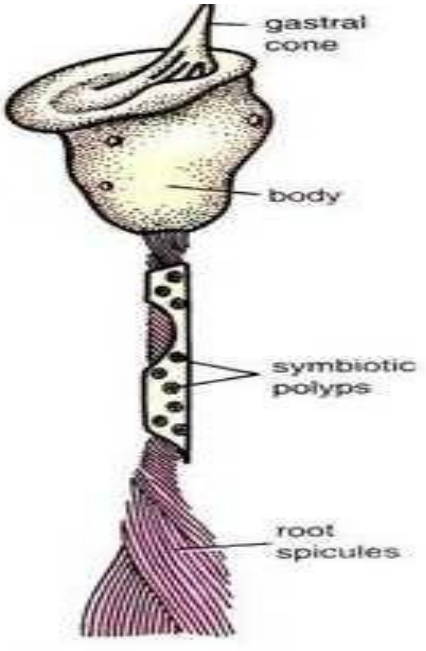


*Fig.3: Hyalonema*

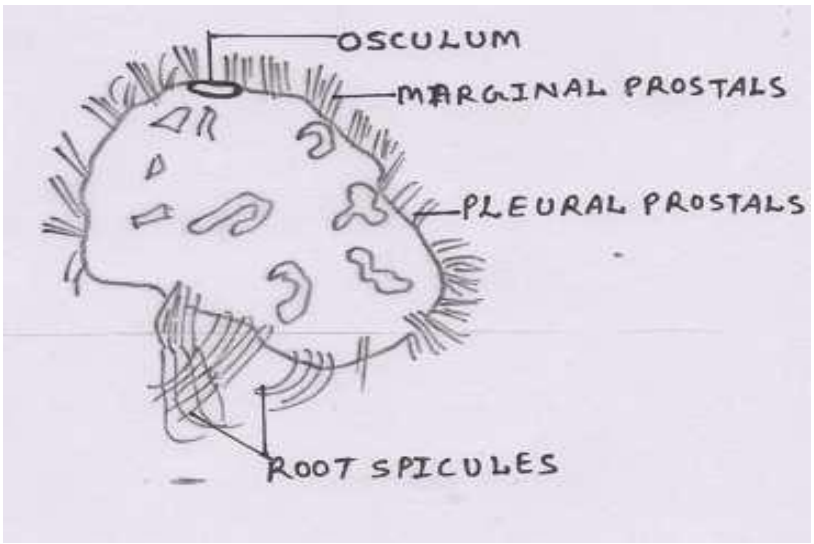


*Fig.4: Pheronema*

## CLASS-3: DEMOSPONGIAE

Solitary or colonial.
Its body is cup or vase shaped.

Demospongiae showed both small and large size.
Spicules are seen monaxon or tetraxon.
The canal system is leuconoid type.
All are marine porifera but except freshwater sponges (Spongillidae).
The class Demospongiae is classified into the three sub classes.

SUBCLASS: 1 TETRACTINELLIDA

Spicules siliceous and four rayed (tetraxon) or absent.
Spongin fibres are absent.
Mostly found in shallow water.
Subclass Tetractinellida has been divided into three orders-

ORDER1- MYXOSPONGIDA
Both spicules and spongin fibres are absent.
Structure simple.
Example- *Oscarella* (Fig.5), *Halisarca*

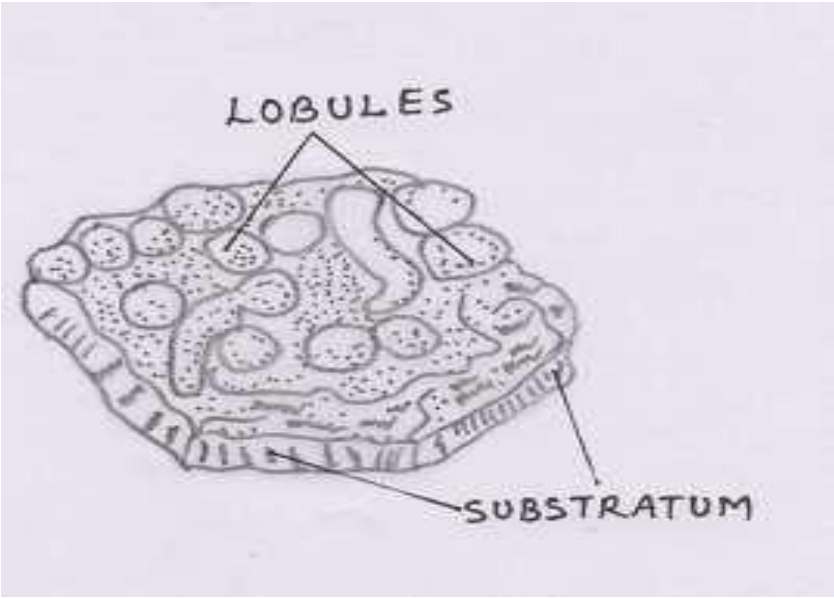


*Fig.5: Oscarella*

ORDER2- CARNOSA

Micro and are indistinct.

All spicules are monaxons. Example- *Chondrilla* and *Plankia.*

ORDER3- CHORISTIDA

Micro. Tetraxon spicules with long axis. Example- *Thenea, Geodia*

SUBCLASS:2 MONAXONIDA

Spicules monaxon and siliceous type.

Spongin fibres some time present or absent.

Mostly monaxonida is occurring in shallow water.

Some subclass lives in deep sea but some found in fresh water.

ORDER1- HADROMARINA

Spongin fibres absent.

Microscleres star shaped when present.

Example- *Cliona* (Fig.6; Boring sponge that bores in molluscan shell)

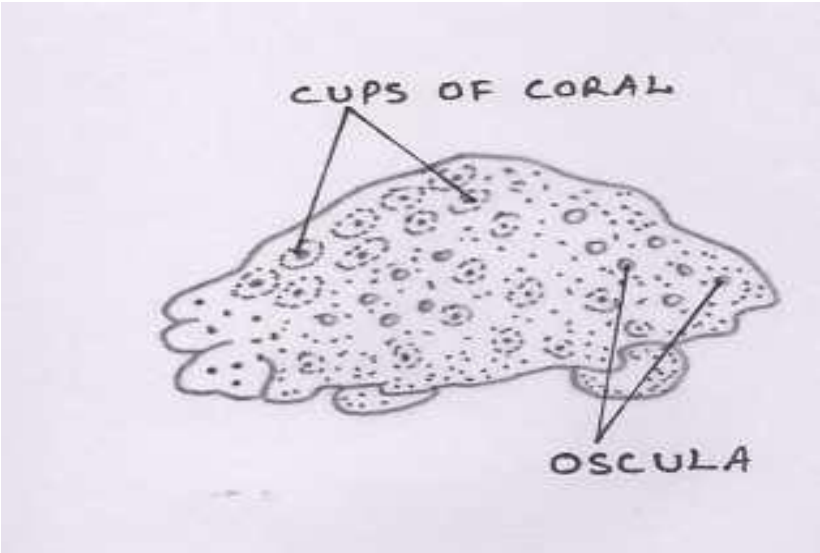


*Fig.6: Cliona*

ORDER2- HALICHONDRINA

Spongin fibres very little.

Microsclers usually absent.

Example-*Halichondria* (Fig.7-Crum of bread loaf).

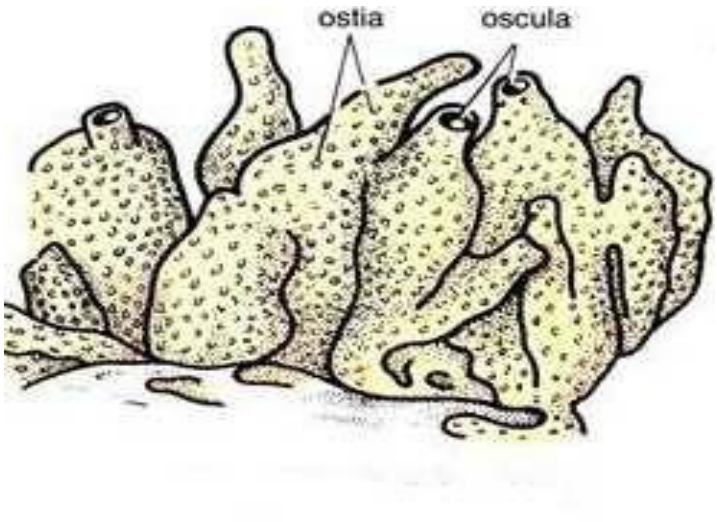


*Fig.7: Halichondria*

ORDER3- POECILOSCLERINA

Large spicules or megascleres of many types and united with spongin fibres and form network.

Microscleres C-shaped.

Example- *Microciona*

ORDER4-HAPLOSCLERINA

Megascleres are only of one type having 2-rays only.

Microscleres may be present or absent.

Spongin fibres present.

Example- *Spongilla* (Fig.8) and *Chalina* (Fig.9-Mermaid's eye)

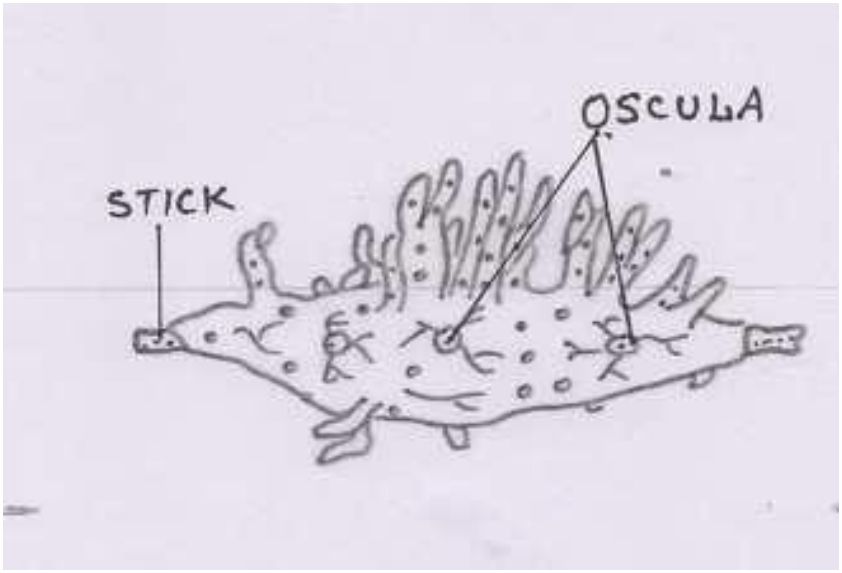


*Fig.8: Spongilla*

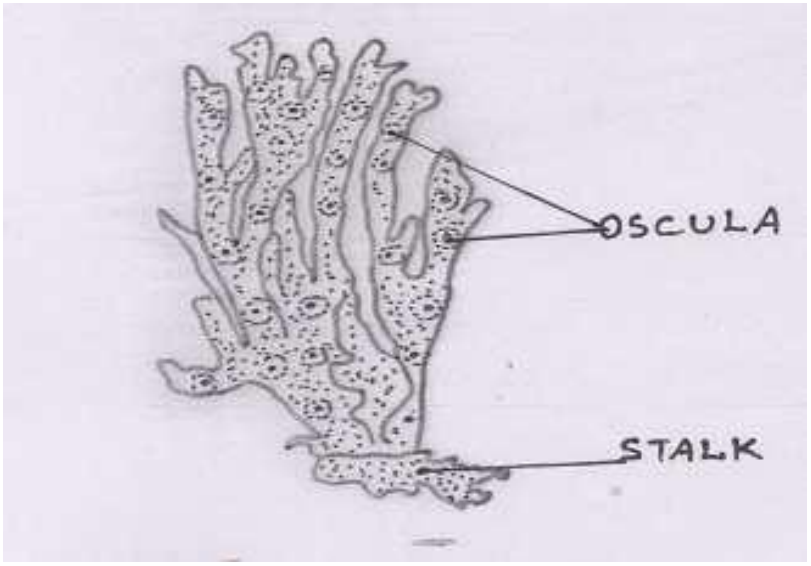


*Fig.9: Chalina*

SUBCLASS: 3 KERATOSA

Generally spicules are absent in subclass Keratosa.
The subclass Keratosa consists of horny sponges.
Skeleton contains spongin fibres only.
Example- Horse sponge (Fig.11-*Hippospongia*) and Bath sponge (Fig.10- Euspongia).

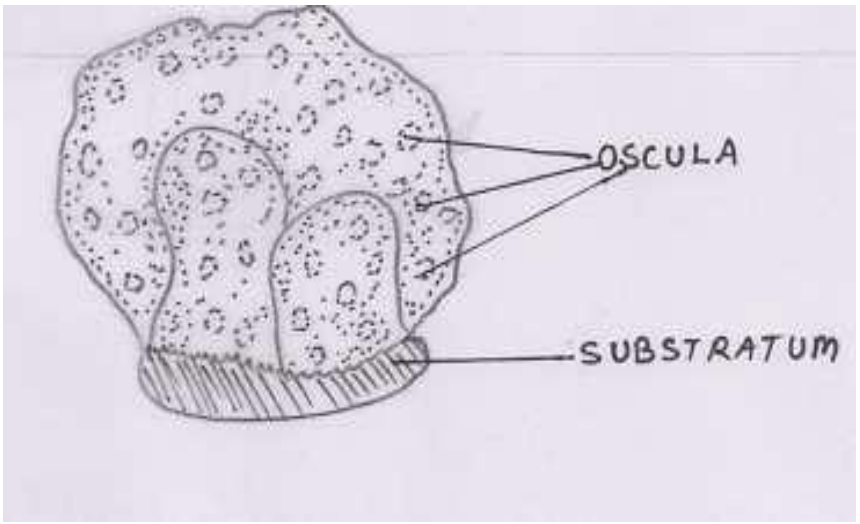


*Fig.10: Euspongia*

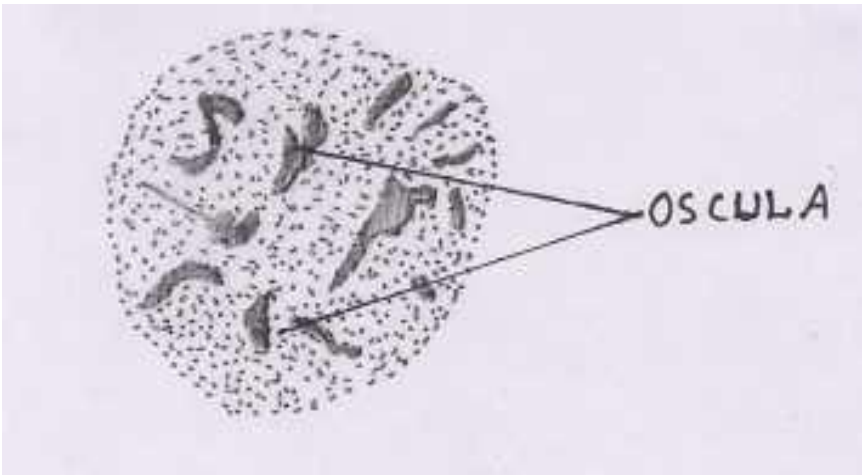


*Fig.11: Hippospongia*